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### INSPEC - 1969 to date (INZZ)

#### Accession number & update

5992585, B9809-1265H-038; 980804.

#### Title

**Encoding** hidden data channels in sigma-delta bitstreams.

#### Author(s)

Magrath-A-J; Sandler-M-B.

#### Author affiliation

Dept of Electr Eng, King's Coll, London, UK.

#### Source

ISCAS '98. Proceedings of the 1998 IEEE International Symposium on Circuits and Systems, vol.1, Monterey, CA, USA, 31 May-3 June 1998.  
In: p.385-8 vol.1, 1998.

#### ISSN

ISBN: 0-7803-4455-3, CCCC: 0 7803 4455 3/98/ (\$10.00).

#### Publication year

1998.

#### Language

EN.

#### Publication type

CPP Conference Paper.

#### Treatment codes

T Theoretical or Mathematical.

#### Abstract

A new technique is introduced which allows a hidden data channel to be **encoded** onto a sigma-delta bit-stream in **addition** to the primary signal **input**. The technique is developed so that the primary signal can be demodulated by standard techniques, without interference by the side-channel. Applications include imprinting a **'watermark'** onto an archived audio recording, or **encoding additional** hidden audio or video channels in the bitstream. Results are presented which indicate that side-channel data rates in excess of 500 kbit/s are possible. (10 refs).

#### Descriptors

channel-coding; sigma-delta-modulation.

#### Keywords

hidden data channel **encoding**; sigma delta bitstream; signal demodulation; **watermark**; archived audio recording; audio channel; video channel; side channel data rate; 500 kbit s.

#### Classification codes

B1265H (A/D and D/A convertors).  
B6120B (**Codes**).

**Numerical indexing**

bit rate: 5.0E+05 bit/s.

**Copyright statement**

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**INSPEC - 1969 to date (INZZ)**

### Accession number & update

6404796, B1999-12-6130C-013, C1999-12-6130M-030; 19991201.

### Title

Non-invertible watermarking methods for MPEG **encoded** audio.

### Author(s)

[Lintain-Qiao](#); [Nahrstedt-K.](#)

### Author affiliation

Lucent Technol, AT&T Bell Labs, Naperville, IL, USA.

### Source

Security and Watermarking of Multimedia Contents, San Jose, CA, USA, 25-27 Jan. 1999.

Sponsors: IS&T, SPIE.

In: Proceedings-of-the-SPIE-The-International-Society-for-Optical-Engineering (USA), vol.3657, p.194-202, 1999.

### CODEN

PSISDG.

### ISSN

ISSN: 0277-786X, CCCC: 0277-786X/99/ (\$10.00).

### Availability

SICI: 0277-786X(1999)3657L:194:IWMM; 1-H.

### Publication year

1999.

### Language

EN.

### Publication type

CPP Conference Paper, J Journal Paper.

### Treatment codes

P Practical.

### Abstract

Nowadays the multimedia technology in distributed environments becomes realistic and the multimedia copyright protection issue becomes more and more important. Various digital watermarking techniques have been proposed in recent years as the methods to protect the copyright of multimedia data. Although, conceptually, these techniques can be easily extended for protecting digital audio data, it is challenging to **apply** these techniques to MPEG audio streams because we need to design the watermarking schemes working directly in the compressed data domain. We present watermarking methods which will **embed** the **watermark** directly into the MPEG audio bit streams rather than going through an expensive **decoding/encoding** process in order to **apply** watermarking schemes in the uncompressed data domain. Among the two presented schemes, one **embeds** the **watermark** into the

scale factors of the MPEG audio streams and **another** one **embeds** the **watermark** into the MPEG **encoded** samples. Our experimental results show that both methods perform well and the distortion could be controlled at the minimal level. While we use MPEG audio **layer** II streams in our experimental tests, the proposed schemes can be applied to MPEG audio **layer** I and III. Furthermore, by enforcing creation of the **watermark** through a standard encryption function such as DES, the proposed schemes will be successful in resolving rightful ownership of watermarked MPEG audio. (17 refs).

**Descriptors**

audio-coding; code-standards; copyright; cryptography; multimedia-systems;  
telecommunication-standards.

**Keywords**

noninvertible watermarking; MPEG **encoded** audio; multimedia; distributed environments; copyright; encryption; audio bit streams; decoding; **encoding**; scale factors; experiment.

**Classification codes**

B6130C (Speech and audiocoding).  
B6120B (Codes).  
B6210R (Multimedia communications).  
C6130M (Multimedia).

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